

Acoustic Addendum – Response to Environmental Health Comments

Unit 3 Arena Court, Mirabel Street, Manchester

Rush242 Trading Limited

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1.0 Introduction

Murray Acoustics Ltd has been commissioned by Rush242 Trading Limited to prepare this technical note in support of the planning application for the change of use of Unit 3, Arena Court, Mirabel Street, Manchester, M3 1PG to a coach-led functional fitness studio (Use Class E(d)). The note is an addendum to the Noise Impact Assessment issued by Murray Acoustics Ltd, reference 21037-RP-NIA-01 dated 10 April 2026 (herein 'the NIA'), and should be read alongside it.

Manchester City Council (MCC) has reviewed the NIA and, through its Environmental Health Officer (EHO), has raised two sets of comments. The first set accepted the assessment with regard to the residential receptor but requested an assessment of noise at the neighbouring commercial units, including noise from free weights and impact machines, and sought clarification of the music volume control described in the operator's Standard Operating Procedure (SOP). The second set, received on 17 August 2026, raised a concern that the assessment did not account for gaps at the top and bottom of the entrance door, suggested that a sealed entrance and mechanical ventilation might be required, and requested a breakdown of the equipment on site together with the specification of the rubber matting. MCC has confirmed that an acoustic addendum is an acceptable means of addressing these points, and that the note should clearly state the type of use proposed and, where additional assessment is not considered necessary, explain why.

The neighbouring premises in question is a locksmith occupying the adjacent railway arch. This note therefore:

- Sets out the proposed use and provides the breakdown of equipment and floor build-up requested by MCC.

- Describes the neighbouring locksmith unit and explains why it is not considered to be a noise sensitive receptor, whilst confirming that an assessment has nevertheless been undertaken.
- Reports additional measurements undertaken by Murray Acoustics Ltd on 29 July 2026 comprising an in-situ airborne sound insulation test between the gym and the locksmith, and a heavy impact test using a loaded barbell dropped within the gym and measured within the locksmith.
- Assesses airborne (music and class) noise and structure-borne (impact) noise within the locksmith against the ProPG: Gym Acoustics Guidance (2023) referenced by the EHO and, for context, against the MCC criteria.
- Responds to each of the EHO's comments in turn, including the matter of the door gaps.

2.0 Comments raised by MCC

For clarity, the comments raised by MCC and its EHO are reproduced below, together with the section of this note in which each is addressed.

Table 1 – EHO comments and where they are addressed

Ref.	Comment (summarised)	Addressed in
EHO 1	The assessment is accepted with regard to the residential receptor. It is assumed the assessment is based on doors closed, as set out in the operational management controls.	Section 7
EHO 2	An assessment of noise at the neighbouring units is required, including noise transfer from free weights areas, weights being dropped on the floor and impact machines. Recommendations may be required for the free weights floor build-up and for impact machines. Music noise is also to be assessed at this receptor.	Sections 4, 5, 6 and 7
EHO 3	The SOP refers to the music level being controlled on the tablet and not exceeding "38". Clarify what 38 refers to, how it is made visible to staff, and whether this level was used during the noise assessment.	Section 7
EHO 4	Further comment may follow once the assessment has been updated.	Noted
MCC 1	The assessment does not account for the 1 inch gaps at the top and bottom of the door and is therefore likely to have produced inaccurate results.	Section 7
MCC 2	Should the amended assessment not demonstrate that the use can be accommodated without detriment to neighbouring amenity, a new or secondary door may be required, which may in turn require mechanical ventilation.	Section 7
MCC 3	A breakdown of the equipment on site and the specifics of the rubber matting are required, and are to be accounted for in the assessment, in order to allow the use of free weights.	Sections 3 and 7

3.0 The proposed use and equipment

3.1 Nature of the use

The proposed use is a small, coach-led functional fitness studio and not a large commercial gym. All sessions are by appointment only, are led by a coach and are limited to a maximum of 10 members per class. The studio is closed outside scheduled class times, with no drop-in or unsupervised use. The operating hours remain as set out in the NIA: 06:00 to 21:00 on weekdays, 09:00 to 14:00 on Saturdays and 10:00 to 14:00 on Sundays.

The operator is relocating from a premises situated directly beneath residential apartments, where noise and vibration were managed successfully through regulated music volume, the use of drop pads, a no-drop policy and direct coach supervision. These practices are carried forward to the proposed premises.

There are no impact machines proposed. No treadmills or similar equipment are included in the fit-out; the cardio equipment comprises rowing and ski ergometers and an air bike, none of which generate impacts. Free weights are used within classes in the form of barbells, dumbbells, kettlebells and medicine balls of the sizes listed below. The studio is not an Olympic weightlifting or powerlifting facility: weights are lowered under control in accordance with the operator's no-drop policy and coaches supervise every session.

3.2 Equipment breakdown

The equipment to be provided on site, as confirmed by the operator on 17 August 2026, is listed in Table 2.

Table 2 – Equipment schedule

Category	Equipment	Quantity / range
Barbells	UKSF Pegasus barbells	5No 15 kg and 5No 20 kg
Plates	UKSF speckled crumb rubber Olympic bumper plates	6No sets of 5 kg, 10 kg, 15 kg and 20 kg
Dumbbells	UKSF dumbbells	Multiple sets, 5 kg to 30 kg
Kettlebells	UKSF kettlebells	Multiple sets, 8 kg to 32 kg
Medicine balls	UKSF medicine balls	3 kg to 12 kg
Plyometric boxes	Rogue plyometric boxes	8No
Cardio equipment	Concept2 RowErg and SkiErg; Rogue Echo Bike	4No RowErg, 1No SkiErg, 1No Echo Bike
Rig	Freestanding 6-bay functional fitness rig bolted to the existing concrete slab	1No

3.3 Floor build-up and impact protection

The following measures have been specifically selected by the operator for their impact and vibration reduction properties and form part of the proposals:

- 20 mm UKSF rubber gym flooring tiles (1 m x 1 m) laid over the existing concrete slab across the full gym floor, so that every area in which weights are used is covered.
- 4No sets of Factory Weights 150 mm thick weightlifting drop pads, used beneath the barbell during lifting.
- Crumb rubber bumper plates on all barbells, which are designed to absorb impact and are substantially quieter than steel plates.

Together with the no-drop policy and coach supervision, this build-up is the 'acoustic floor build-up for the free weights area' contemplated by the EHO. The measurements reported in Section 5 were undertaken with the rubber tiles in place (but not directly onto specific drop pads, in order to demonstrate the general floor performance) and therefore reflect the performance of this build-up directly.

4.0 The neighbouring locksmith unit

The railway arch to one side of Unit 3 is in commercial use, the other side is a solid infilled arch. To the other side is a locksmith, which is the neighbouring premises identified by MCC. Both units sit beneath the operational railway viaduct serving Manchester Victoria station, with trains passing directly overhead at frequent intervals throughout the day.

The locksmith is a Class E commercial premises. It is not a dwelling, is not occupied at night, and its own activities (key cutting and machining, tools, customer service) generate noise levels within the unit that are considerably higher than anything transmitted from an adjoining unit. Its trading hours overlap with the proposed classes. Beneath a live railway, the prevailing noise climate within the unit is dominated by train pass-bys, which are clearly audible and perceptible as low frequency rumble within the arch. The locksmith is therefore not considered to be a noise sensitive receptor in the ordinary sense, and neither the MCC Planning and Noise Technical Guidance nor the NIA identify it as such.

Notwithstanding this, and in order to address the EHO's request fully, an assessment of both airborne and structure-borne noise from the proposed use within the locksmith has been undertaken on the basis of direct measurement, as reported below.

During the site visit on 29 July 2026 the member of staff present at the locksmith was asked whether noise from the neighbouring unit was ever noticeable. He confirmed that he had not heard anything from next door and that they were not concerned about noise

transfer, specifically commenting that *“the noise we make in here is louder than anything that would come through from next door”*.

5.0 Additional measurements, 29 July 2026

5.1 Procedure

Attended measurements were undertaken by Murray Acoustics Ltd between 10:48 and 10:55 on Wednesday 29 July 2026 with the co-operation of the operator and the locksmith. Two tests were carried out:

- **In-situ airborne sound insulation test.** A loudspeaker was operated within the gym to generate a test signal at a high level, and the resulting sound pressure level was measured within the gym (source room) and then within the locksmith (receiving room). The background sound level within the locksmith was then measured with the source switched off. The level difference between the two rooms has been derived in one-third octave and octave bands, with the receiving room level corrected for background sound in accordance with the method of BS EN ISO 16283-1:2014. Where the receiving room level was within 6 dB of the background, a correction of 1.3 dB has been applied and the resulting level difference is reported as a lower limit. The test is of the separating construction as it exists, with the entrance doors closed.
- **Heavy impact test.** A barbell loaded to 60 kg was lifted to chest height and dropped onto the gym floor 5 times in succession by a member of the operator's staff, at a position within the gym approximately 2 m from the party wall, while the sound pressure level was logged within the locksmith at 1-second resolution with one-third octave band L_{Zeq} and L_{ZFmax} spectra. This follows the 'Method 2' approach of the ProPG: Gym Acoustics Guidance, in which the heaviest proposed unit is dropped in a representative manner by fitness personnel. A 60 kg load dropped from chest height is deliberately well in excess of anything that would occur under the operator's no-drop policy and coached format, and therefore represents a reasonable worst case.

Within the locksmith the microphone was positioned approximately 1.5 m above floor level, at least 1 m from the party wall and other reflecting surfaces.

5.2 Equipment

Measurements were undertaken using the Class 1 instrumentation listed in Table 3. The equipment calibration was verified before and after use and no abnormalities were observed.

Table 3 – Survey equipment

Equipment	Serial No.	Calibration Date	Certificate No.
Class 1 Sound Level Meter Svantek Type 971A	173136	19 Jan 2026	1516680-1
Preamplifier Svantek SV18A	163637	19 Jan 2026	1516680-1
Free-field Microphone ACO 7152	96767	19 Jan 2026	1516680-1
Class 1 Acoustic Calibrator Svantek SV33B	182123	30 Jan 2026	C182123-1

5.3 Airborne sound insulation results

The measured sound pressure levels and the resulting level difference between the gym and the locksmith are given in Table 4. The source room level of 80 dB L_{Aeq} is higher than the internal level measured during a representative class in the NIA (76 dB L_{Aeq}), so the receiving room level measured during the test is itself a direct upper bound on the level that a class would produce within the locksmith.

Table 4 – In-situ airborne sound insulation test, gym to locksmith, 29 July 2026

Parameter	63	125	250	500	1k	2k	4k	dB(A)
Source room level, gym (dB L_{Zeq})	84	89	76	74	77	70	63	80
Receiving room level, locksmith, source on (dB L_{Zeq})	51	48	37	32	31	27	25	37
Background level, locksmith, source off (dB L_{Zeq})	46	42	37	31	28	24	24	34
Level difference, D (dB)	≥ 34	42	≥ 41	≥ 44	≥ 48	≥ 44	≥ 39	≥ 44

Octave band centre frequencies are in Hz. The receiving room level was within 6 dB of the background in all bands other than 125 Hz, which is to say that the test signal was barely measurable within the locksmith even at 80 dB L_{Aeq} in the gym. The level difference is therefore a lower limit in those bands, and the true performance of the separating construction is higher. The broadband level difference of at least 44 dB(A) is consistent with the solid masonry construction of the arch piers between the units.

5.4 Heavy impact test results

The sequence of 5No barbell drops is identifiable as a series of low-to-mid frequency events at 40 to 44 dB L_{AFmax} against a residual level within the locksmith of approximately 28 dB L_{A90} . The drops were only just audible within the locksmith and would not have been noticed had the listener not been waiting for them.

The maximum one-third octave band levels recorded within the locksmith during the drop sequence are summarised in Table 5 alongside the maximum levels recorded during the background measurement, when no activity was taking place in the gym.

Table 5 – Maximum levels within the locksmith, barbell drops and existing background

Parameter	63 Hz	125 Hz	250 Hz	500 Hz	dB(A)
60 kg barbell drops, L_{ZFmax} (max-hold over sequence)	47	43	39	37	44
Existing background, L_{ZFmax} (max-hold, no gym activity)	51	46	41	36	42

The LAFmax of the drops (44 dB) is comparable with the LAFmax recorded within the locksmith with no activity in the gym at all (42 dB), and at every frequency at or below 125 Hz the existing background maxima exceed the levels produced by the drops.

6.0 Assessment within the locksmith

6.1 Criteria

The EHO has referred to the ProPG: Gym Acoustics Guidance (ANC, IOA and CIEH, March 2023) (herein ‘the GAG’). The GAG is directed at the protection of sensitive receptors and provides, in its Table 2, guide internal target criteria for gym activity within adjoining spaces expressed as one-third octave band G-curves, with airborne sound (such as music) assessed on an L_{eq} basis and heavy impact sound on an L_{Fmax} basis. For retail areas the guide ranges are G30 to G45 for airborne sound and G35 to G50 for heavy impact sound, with the guidance noting that levels below the upper values were generally found to avoid significant adverse effects. The GAG also recognises that these values will not suit every setting, and that where background levels are higher more relaxed criteria may be appropriate. A locksmith’s workshop and counter beneath a railway is such a setting, and the retail criteria have been applied here as a conservative benchmark.

The GAG further recommends that heavy impact noise at frequencies of 80 Hz and below should not exceed the existing background level within commercial and retail adjacencies by more than 20 dB $L_{A90,5min}$ in order to avoid low frequency sound becoming prominent where the background is low.

For context only, MCC’s own condition wording for structurally adjoined residential properties limits entertainment noise in habitable rooms to 47 dB and 41 dB $L_{eq,5min}$ in the 63 Hz and 125 Hz octave bands respectively. The locksmith is not residential and this criterion does not apply to it, but it is a useful reference point.

6.2 Airborne noise from classes and music

The internal sound pressure level measured during a representative class in the NIA (76 dB L_{Aeq} , with the music at the SOP level) has been combined with the measured level difference in Table 4 to predict the level within the locksmith during a class. Because the level difference is a lower limit in most bands, the predicted level is an upper bound. The result is compared with the existing background within the locksmith and with the MCC 63 Hz and 125 Hz values in Table 6.

Table 6 – Predicted class noise within the locksmith

Parameter	63	125	250	500	1k	2k	4k	dB(A)
Internal level during class, gym (dB L_{eq} , from NIA Table 4.2)	75	80	63	64	75	64	56	76
Level difference, D (dB, Table 4)	≥ 34	42	≥ 41	≥ 44	≥ 48	≥ 44	≥ 39	-
Predicted level within locksmith (dB L_{eq} , upper bound)	≤ 41	38	≤ 22	≤ 20	≤ 27	≤ 20	≤ 17	≤ 30
Existing background within locksmith (dB L_{eq})	46	42	37	31	28	24	24	34
MCC residential criterion, for context (dB $L_{eq,5min}$)	47	41	-	-	-	-	-	-

Noise from a class in full operation is predicted to be no more than 30 dB L_{Aeq} within the locksmith, below the existing background sound level within the unit in every octave band and some 5 dB below it overall. The predicted levels in the 63 Hz and 125 Hz bands also sit below the MCC values applied to habitable rooms of dwellings, even though the receptor is a commercial workshop. On a one-third octave basis the predicted spectrum rates at approximately G32, at the lower end of the G30 to G45 range given in the GAG for retail areas, and is at or below the locksmith's own background spectrum across the range, as shown in Figure 1.

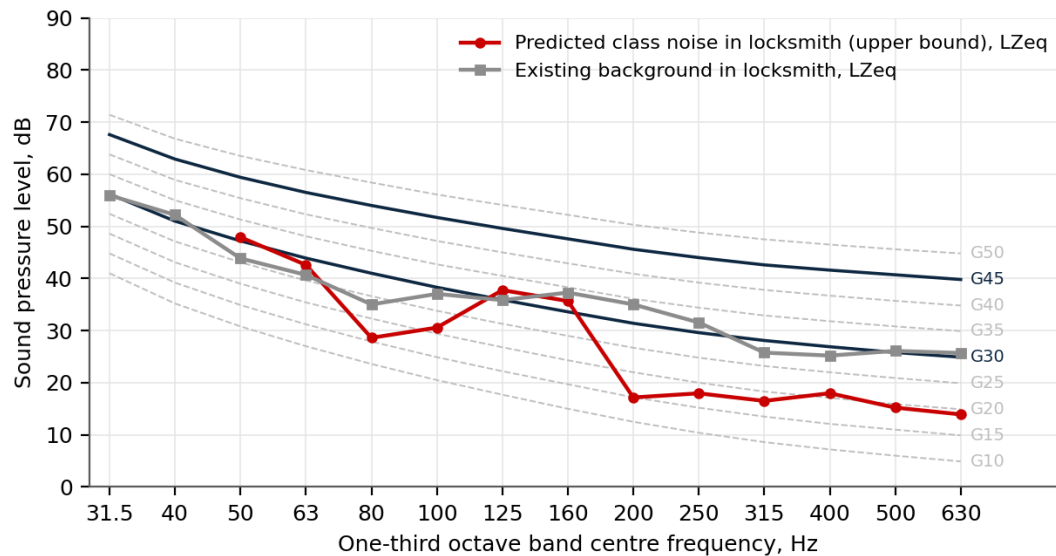


Figure 1 – Predicted class noise within the locksmith against the GAG airborne G-curves

6.3 Structure-borne noise from free weights

The measured maximum one-third octave band levels within the locksmith during the 60 kg barbell drops are plotted against the GAG heavy impact G-curves in Figure 3, together with the maximum levels recorded within the locksmith with no activity in the gym.

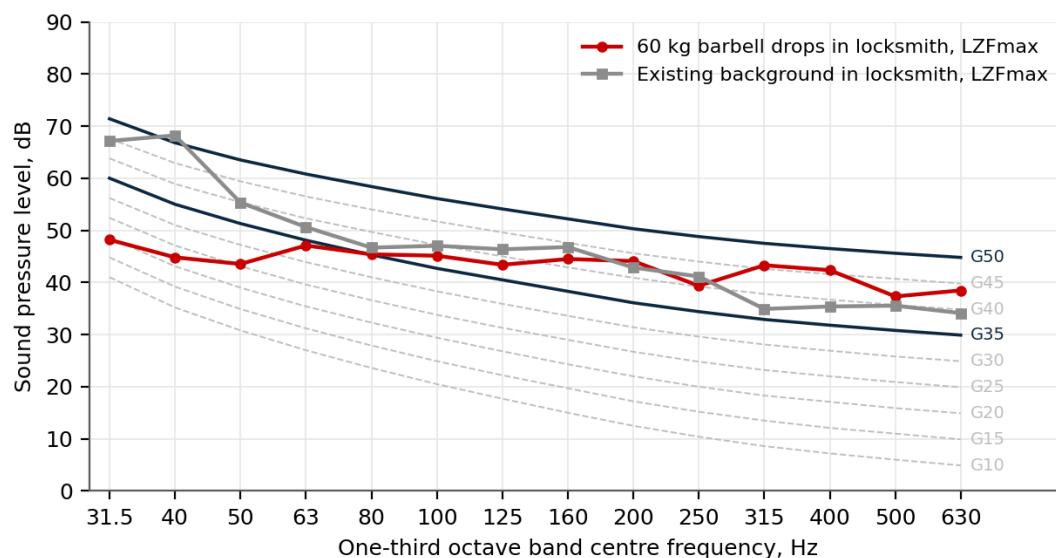


Figure 2 – 60 kg barbell drops measured within the locksmith against the GAG heavy impact G-curves

The drops rate at approximately G46, within the G35 to G50 range given in the GAG for retail areas, with the rating governed by the 400 Hz band at 42 dB, which is around the level of quiet speech. The existing background maxima within the locksmith, driven by

train pass-bys overhead, rate at approximately G52 and exceed the drop levels at every frequency at or below 125 Hz. At 80 Hz and below the drop levels (43 to 48 dB) do not exceed the residual background of 28 dB LA90 by more than 20 dB, satisfying the GAG low frequency recommendation.

It is emphasised that this result was obtained with a 60 kg barbell deliberately dropped from chest height, which is well beyond anything that occurs during a class under the operator's no-drop policy and coach supervision, and that the equipment producing it was the proposed floor build-up. Normal use of dumbbells, kettlebells and medicine balls, and box jumps onto plyometric boxes, involve far lower impact energy than the test and are enveloped by it.

6.4 Findings

On the basis of direct measurement, airborne noise from classes and music, and structure-borne noise from the use of free weights, would both be below the existing background sound levels within the locksmith and within the GAG guide criteria for retail premises, before any account is taken of the fact that the locksmith is a commercial workshop beneath a railway rather than a sensitive receptor. No additional acoustic treatment of the separating construction, and no acoustic floor build-up beyond that already proposed, is required.

7.0 Response to the comments

7.1 EHO 1 – Doors closed assumption

Confirmed. The internal class measurements, the façade sound insulation test and the assessment at the residential receptor in the NIA were all undertaken and calculated on the basis of the entrance doors being closed during classes, as required by the operator's management controls. The operation of the studio with doors closed during classes should be carried forward as a condition of the operational management plan.

7.2 EHO 2 – Neighbouring units, free weights and impact machines

The neighbouring locksmith has been assessed in Sections 4 to 6. Airborne noise from classes and music, and structure-borne noise from free weights, have both been assessed by direct measurement and found to be below the existing background within the locksmith and within the GAG guide criteria for retail premises. There are no impact machines proposed. No reduction in the recommended music limits is required, and no recommendations for additional floor build-up or insulation measures arise: the 20 mm rubber tiles, drop pads and bumper plates already proposed are the measures on which the assessment is based and should be retained as part of the scheme.

7.3 EHO 3 – Music level “38”

The music within the studio is played from a single portable loudspeaker controlled by the coach from a tablet. The figure of 38 is the volume setting displayed on the tablet, and is visible to the coach on the screen throughout the class. The SOP fixes this as the maximum setting and prohibits adjustment by members. The operator has confirmed that the tablet was set to 38 during the class measured on 27 March 2026, and the internal levels reported in the NIA, and used in this note, therefore correspond to that setting. It is recommended that the SOP be updated to state explicitly that “38” refers to the tablet volume setting and that the setting is to be checked by the coach at the start of each session.

7.4 MCC 1 – Gaps at the top and bottom of the door

The sound insulation of the entrance doorset was not calculated from laboratory data or assumed; it was measured in situ, as installed, with a loudspeaker inside the unit and the microphone outside. An in-situ test of this kind measures the sound that actually passes through the whole doorset, including through any gaps at its head, sill and edges, because the sound reaching the external microphone has travelled through every available path. The gaps at the top and bottom of the door were therefore present during the test and are fully accounted for in the measured level difference in Table 4.1 of the NIA and in the assessment that follows from it. The NIA does not need to be updated on this point, and its results are not inaccurate. Indeed, the measured level differences (17 to 27 dB) are lower than would be expected of a well-sealed doorset, which is precisely because the test captured the gaps as they exist.

It is also noted that the door concerns the external façade and hence the residential receptor across Mirabel Street, in respect of which MCC has already accepted the assessment. The path to the locksmith is the separating construction between the arches, which has been tested separately as reported in Section 5.

7.5 MCC 2 – Sealed entrance and mechanical ventilation

As the assessment demonstrates that the use can be accommodated without detriment to neighbouring amenity with the existing doors as they are, no new or secondary door is required and the question of mechanical ventilation does not arise.

7.6 MCC 3 – Equipment and rubber matting

The breakdown of equipment and the specification of the rubber matting and drop pads are given in Section 3. The heavy impact measurements in Section 5 were undertaken using this equipment and floor build-up, with a load well in excess of that used in classes, and the free weights use has been assessed on that basis in Section 6. The use of free

weights of the sizes listed in Table 2, with the floor build-up described in Section 3 and under the operator's no-drop policy and coach supervision, is supported by the assessment.

8.0 Conclusion

MCC has accepted the NIA in respect of the residential receptor and has asked for the neighbouring locksmith to be assessed, for the gaps at the entrance door to be accounted for, and for details of the equipment and matting to be provided.

The locksmith is a commercial workshop beneath an operational railway viaduct and is not considered to be a noise sensitive receptor. It has nonetheless been assessed by direct measurement. An in-situ airborne sound insulation test found a level difference between the gym and the locksmith of at least 44 dB(A), such that a class in full operation would produce no more than 30 dB L_{Aeq} within the locksmith, below the existing background in the unit in every octave band and within the GAG guide criteria for retail premises. A 60 kg barbell dropped repeatedly from chest height within the gym, a load well beyond normal class use, produced no more than 44 dB L_{AFmax} within the locksmith, comparable with the maxima that occur within the unit with no activity in the gym at all, and within the GAG heavy impact criteria for retail premises.

The sound insulation of the entrance door was measured in situ and therefore already includes the effect of the gaps at its top and bottom; no correction to the NIA is required, no new or secondary door is needed and mechanical ventilation is not triggered. The equipment schedule and floor build-up have been provided and the assessment is based on them. No additional mitigation is required beyond the measures already forming part of the proposals, namely the 20 mm rubber flooring, drop pads and bumper plates, the no-drop policy and coach supervision, operation with the doors closed during classes and the music SOP.

Murray Acoustics Ltd would be happy to discuss any aspect of this note with the EHO directly.